wherein $R^9$ is absent or is selected from one or more of the group consisting of $C_1$-$C_{12}$ alkylene or oxyalkylene; $C_1$-$C_{12}$ alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; $C_5$-$C_{10}$ cycloalkylene; and $C_5$-$C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; and

3) $C_1$-$C_{10}$ cellulose ester having a DS equal to or less than about 2.5.

## REMARKS

The Office Action has rejected claims 1-7, 9-11, 14-15, 17-19 and 21-28. Claims 8, 12-13, 16 and 20 have been withdrawn from consideration due to a previous election of species. Claims 6, 19 and 23 have been cancelled, without prejudice. Claims 1, 7, 10 and 22-23 have been amended herein to further define the invention. Claim 7 has further been amended to correct a typographical error. A mark-up version of the amended claims is attached herewith. In light of the Amendment and Remarks herein, it is respectfully stated that the application is in condition for allowance.

### I. Rejection under 35 U.S.C. §112

The Office Action has rejected claim 7 under 35 U.S.C. § 112, paragraph 2, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Specifically, the Office Action states that the second occurrence of "or" in claim 7 renders the claim indefinite. In response to this rejection, claim 7 has been amended to correct this typographical error.

## II. Rejection in Light of Sharak and Blumenthal

The Office Action has rejected claims 1-7, 9-11, 14-15, 17-19 and 21-28 under 35 U.S.C. § 102(b) as being anticipated by Sharak *et al.* (U.S. Patent No. 5,583,187) and Blumenthal *et al.* (U.S. Patent No. 5,750,605). Specifically, the Office Action asserts that each of the references teaches compositions comprising biodegradable polyester and terepene-phenol resin. The Office Action further asserts that because the terepene-phenol resin inherently slows the degradation rate of the degradable polyester, use of the aliphatic-aromatic copolyester would have been obvious in light of the teachings of these references.

Claims 1, 10 and 22 have been amended to recite the specific formula for the aliphatic-aromatic copolyester of the structure set forth in original claims 6, 19 and 23, respectively. As discussed below, Sharak and Blumenthal do not anticipate claims 1, 10 and 22 of the claimed invention, as amended.

Sharak discloses a hot melt adhesive mixed with a phenol-terpene resin. Blumenthal discloses hot melt adhesives that can comprise phenol terpene resin. Sharak and Blumenthal do not disclose an aliphatic aromatic copolyester wherein $R_{11}$ and $R_{12}$ are 100 % of the diol components. As such, neither Sharak nor Blumenthol anticipates Applicants' invention.

Moreover, Sharak and Blumenthal do not do not suggest or motivate one to prepare a copolyester having 100% of the diol components as claimed in this invention, whether taken alone or in combination.

In particular, Sharak focuses its disclosure on the selection of glycidyl ethers that comprise the final methoyl polyesters. There is no discussion whatsoever of adjusting the components to result in the compositions claimed by Applicants. Further, while Sharak mentions that the methoyl polyester/phenol terepene resin hot melt compositions are biodegradable, there is no suggestion or motivation in this reference that the phenol

terpene resin slows the degradation of a biodegradable composition.[1] Thus, the methods of the claimed invention are not rendered obvious over Sharak for this additional reason.

Blumenthal also does not suggest or motivate to compositions and methods as claimed by Applicants. Blumenthal's disclosed copolyesters do not suggest or motivate to the specific diol identities and ratios as are currently claimed by Applicants. To the contrary, Blumenthal's polyesters comprise a number of different potential sources of hydroxyl components, none of which are similar to the diol ratio recited in the present claims. Accordingly, Blumenthal does not render Applicants' invention obvious.

**III. Rejection in light of Schoenberg, Rutherford, Iovine or Kaufman**

The Office Action has rejected claims 1-6, 9-11, 14-15, 17-19, 21-23 and 25-28 under 35 U.S.C. § 102(b). Specifically, the Office Action asserts that each of the references discloses compositions comprising degradable polymer and terpene-phenol resin.

Schoenberg *et al.* (U.S. Patent No. 5,942,405) discloses graft copolymers prepared from lactide and ethylenically unsaturated monomers that may be used in hot melt adhesives and pressure sensitive adhesives. Rutherford *et al.* (U.S. Patent No. 5,753,364) discloses for pressure sensitive adhesives prepared from materials comprising poly(β-hydroxyorganoates) which are ester-containing materials derived from bacteria. Rutherford's compositions may comprise a phenol-terepene tackifier. Iovine *et al.* (U.S. Patent No. 5,252646) discloses hot melt adhesives comprising polylactide homo- or copolymer and a tackifying resin, wherein the tackifying resins may be terepene phenols. Kauffmann *et al.* (U.S. Patent No. 5,169,889) discloses hot melt adhesives derived from the fermentation of sugars; Kaufman's compositions may comprise phenol terpene resins.

[1] Since neither Sharak nor the other references cited in the Office Action discloses the specifically claimed aliphatic–aromatic copolyesters, as discussed in detail herein, the claimed compositions and methods are not anticipated. As such, any rejections based upon an allegation of inherency have been overcome. Further, it is understood that an allegation of inherency is irrelevant in an obviousness rejection.

None of Schoenberg, Rutherford, Iovine or Kauffman disclose that $R_{11}$ and $R_{12}$ comprise 100 % of the diol components. As such, none of these references anticipate the claimed invention which, as amended, expressly recites this specific ratio of diol in the claimed aliphatic-aromatic copolyesters.

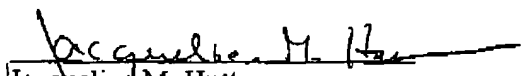
Moreover, the adhesive materials disclosed in Schoenberg, Rutherford, Iovine and Kauffman are derived from natural sources. None of the cited references disclose that suggest or motivate that these naturally derived materials may be modified to provide aliphatic-aromatic copolyesters having the claimed diol component identity and ratios. Indeed, as naturally-derived materials, it follows that the components of such materials may not easily be modified, if at all. As such, these references cannot render the present invention obvious.

## CONCLUSION

In light of the above Amendments and Remarks, Applicants respectfully request that the rejections be withdrawn.

Payment in the amount of $110.00 for the One Month Extension of Time is to be charged to a credit card and such payment is authorized by the signed, enclosed document entitled: Credit Card Payment Form PTO-2038; however, the Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 14-0629.

Respectfully submitted,
NEEDLE & ROSENBERG, P.C.



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**ATTORNEY DOCKET NO.: 05015.0365U1**
**App. Serial No.: 09/662,965**

**CERTIFICATE OF FACSIMILE TRANSMISSION**

I hereby certify that this AMENDMENT is being sent via facsimile transmission addressed to (703) 308-2395, ATTN: EXAMINER P. SHORT, GROUP 1712, Commissioner for Patents, Washington, D.C. 20231, on the date shown below.

Jacqueline M. Hutter — Date: 4/24/02

Jacqueline M. Hutter

Date

**ATTORNEY DOCKET NO.: 05015.0365U1**
**App. Serial No.: 09/662,965**

**MARKED-UP VERSION OF AMENDMENTS**

Please cancel claims 6, 19 and 23, without prejudice.

Please amend claims 1, 7, 10 and 22-23 as follows:

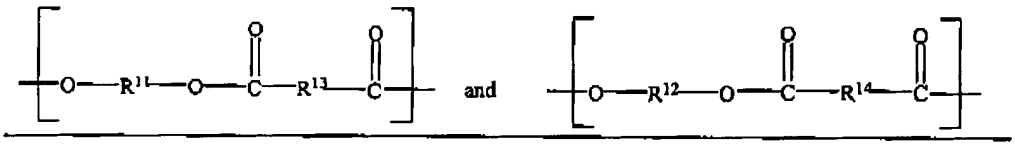
1. (Amended) A method for slowing the degradation rate of a biodegradable polymer composition wherein the method comprises:

   a. introducing a phenol-containing compound comprising terpene-phenol resin into a biodegradable polymer or biodegradable polymer composition in an amount sufficient to slow the degradation rate of the biodegradable polymer or biodegradable polymer composition; and

   b. mixing the phenol-containing compound with the biodegradable polymer or biodegradable polymer composition;

   wherein the biodegradable polymer or biodegradable polymer composition comprises one or more of:

1. an aliphatic-aromatic copolyester having repeat units of the following structures:




wherein

(i) $R^{11}$ and $R^{12}$ are the same or different, and are residues of one or more of diethylene glycol, propylene glycol, 1,3-propanediol, 2,2-dimethyl-1,3-propanediol, 1,3-butanediol, 1,4-butanediol, 1,5-pentanediol, 1,6-hexanediol, 2,2,4-trimethyl-1,6-hexanediol, thiodiethanol, 1,3-cyclohexanedimathanol, 1,4-

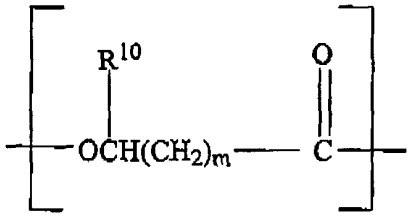
cyclohexanedimethanol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, triethylene glycol, or tetraethylene glycol;

(ii) $R^{11}$ and $R^{12}$ are 100% of the diol components in the copolyester;

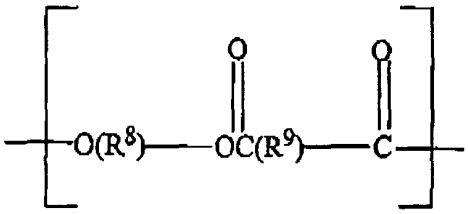
(iii) $R^{13}$ is absent or is selected from one or more of the groups consisting of $C_1$ - $C_{12}$ alkylene or oxyalkylene; $C_1$ - $C_{12}$ alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$ - $C_{10}$ aryl, and $C_1$ - $C_4$ alkoxy; $C_5$ - $C_{10}$ cycloalkylene; and $C_5$ - $C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$ - $C_{10}$ aryl, and $C_1$ - $C_4$ alkoxy; and

(iv) $R^{14}$ is selected from one or more of the groups consisting of $C_6$ - $C_{10}$ aryl, and $C_6$ - $C_{10}$ aryl substituted with one to four substituents independently selected from the group consisting of halo, $C_1$ - $C_4$ alkyl, and $C_1$ - $C_4$ alkoxy;

2. an aliphatic polyester having repeat units of one or more of the following structures:



or



wherein m is an integer of from 0 to 10, and $R^{10}$ is selected from the group consisting of hydrogen; $C_1$-$C_{12}$ alkyl; $C_1$-$C_{12}$ alkyl substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; $C_5$-$C_{10}$ cycloalkyl; and $C_5$-$C_{10}$ cycloalkyl substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy,

wherein $R^8$ is selected from the group consisting of $C_2$-$C_{12}$ alkylene or $C_2$-$C_{12}$ oxyalkylene; $C_2$-$C_{12}$ alkylene or $C_2$-$C_{12}$ oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; $C_5$-$C_{10}$ cycloalkylene; $C_5$-$C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy, and

wherein $R^9$ is absent or is selected from one or more of the group consisting of $C_1$-$C_{12}$ alkylene or oxyalkylene; $C_1$-$C_{12}$ alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; $C_5$-$C_{10}$ cycloalkylene; and $C_5$-$C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; and

3) a $C_1$-$C_{10}$ cellulose ester having a DS equal to or less than about 2.5.

7. (Amended) The method of claim [6] 1 wherein the biodegradable polymer or biodegradable polymer composition comprises the aliphatic-aromatic copolyester and wherein $R^{11}$ and $R^{12}$ are the same or different, and are selected from the group consisting of residues of one or more of glycol, propylene glycol, 1,3-propanediol, [or] 1,3-butanediol, and 1,4-butanediol, $R^{13}$ is selected from the group consisting of malonic acid, succinic acid, glutaric acid, adipic acid, pimelic acid, 2,2-dimethyl glutaric acid, diglycolic acid, and an ester forming derivative thereof, and $R^{14}$ is selected from the group consisting of one or more of 1,4-

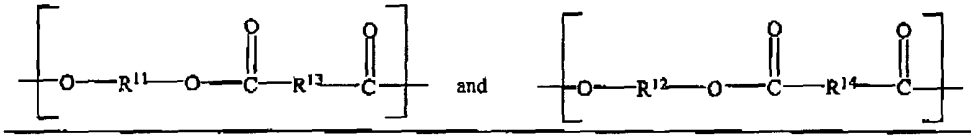
terephthalic acid, 1,3-terephthalic acid, 2,6-naphthoic acid, 1,5-naphthoic acid, and an ester forming derivative thereof.

10. (Amended) A method for slowing the degradation rate of a biodegradable polymer or polymer composition, wherein the method comprises:

(a) introducing a phenol-containing compound into a biodegradable polymer or polymer composition in an amount sufficient to slow the degradation rate of the biodegradable polymer or polymer composition; and

(b) mixing the phenol-containing compound with the biodegradable polymer or polymer composition, wherein the biodegradable polymer comprises one or more of the following:

1. an aliphatic-aromatic copolyester having repeat units of the following structures:




wherein

(i) $R^{11}$ and $R^{12}$ are the same or different, and are residues of one or more of diethylene glycol, propylene glycol, 1,3-propanediol, 2,2-dimethyl-1,3-propanediol, 1,3-butanediol, 1,4-butanediol, 1,5-pentanediol, 1,6-hexanediol, 2,2,4-trimethyl-1,6-hexanediol, thiodiethanol, 1,3-cyclohexanedimathanol, 1,4-cyclohexanedimethanol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, triethylene glycol, or tetraethylene glycol;

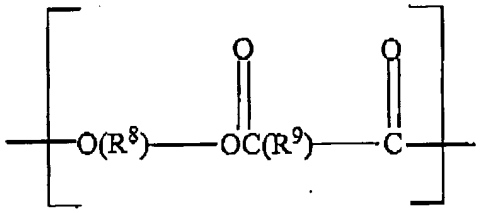
(ii) $R^{11}$ and $R^{12}$ are 100% of the diol components in the copolyester;

(iii) $R^{13}$ is absent or is selected from one or more of the groups consisting of $C_1$ - $C_{12}$ alkylene or oxyalkylene; $C_1$ - $C_{12}$ alkylene or oxyalkylene substituted with one to four substituents independently

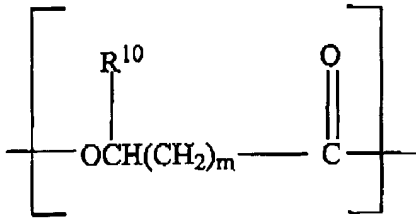
selected from the group consisting of halo, $C_6$ - $C_{10}$ aryl, and $C_1$ - $C_4$ alkoxy; $C_5$ - $C_{10}$ cycloalkylene; and $C_5$ - $C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$ - $C_{10}$ aryl, and $C_1$ - $C_4$ alkoxy; and

(iv) $R^{14}$ is selected from one or more of the groups consisting of $C_6$ - $C_{10}$ aryl, and $C_6$ - $C_{10}$ aryl substituted with one to four substituents independently selected from the group consisting of halo, $C_1$ - $C_4$ alkyl, and $C_1$ - $C_4$ alkoxy;

2) an aliphatic polyester having repeat units of one or more of the following structures:



or



wherein m is an integer of from 0 to 10, and $R^{10}$ is selected from the group consisting of hydrogen; $C_1$-$C_{12}$ alkyl; $C_1$-$C_{12}$ alkyl substituted with one to

four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; $C_5$-$C_{10}$ cycloalkyl; and $C_5$-$C_{10}$ cycloalkyl substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy,

wherein $R^8$ is selected from the group consisting of $C_2$-$C_{12}$ alkylene or $C_2$-$C_{12}$ oxyalkylene; $C_2$-$C_{12}$ alkylene or $C_2$-$C_{12}$ oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; $C_5$-$C_{10}$ cycloalkylene; $C_5$-$C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy, and

wherein $R^9$ is absent or is selected from one or more of the group consisting of $C_1$-$C_{12}$ alkylene or oxyalkylene; $C_1$-$C_{12}$ alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; $C_5$-$C_{10}$ cycloalkylene; and $C_5$-$C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; and

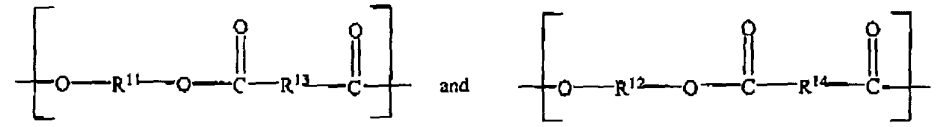
3) $C_1$-$C_{10}$ cellulose ester having a DS equal to or less than about 2.5.

22. (Amended) A biodegradable polymer composition comprising:

a. a phenol-containing compound comprising terpene-phenol resin incorporated in the biodegradable polymer or biodegradable polymer-second material composition, the phenol-containing compound being present at an amount sufficient to slow the degradation rate of the biodegradable polymer or biodegradable polymer second-material composition.

b. a biodegradable polymer or biodegradable polymer-second material composition comprising one or more of the following:

1. an aliphatic-aromatic copolyester having repeat units of the following structures:



wherein

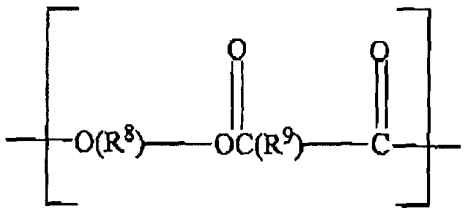
(i) $R^{11}$ and $R^{12}$ are the same or different, and are residues of one or more of diethylene glycol, propylene glycol, 1,3-propanediol, 2,2-dimethyl-1,3-propanediol, 1,3-butanediol, 1,4-butanediol, 1,5-pentanediol, 1,6-hexanediol, 2,2,4-trimethyl-1,6-hexanediol, thiodiethanol, 1,3-cyclohexanedimathanol, 1,4-cyclohexanedimethanol, 2,2,4,4-tetramethyl-1,3-cyclobutanediol, triethylene glycol, or tetraethylene glycol;

(ii) $R^{11}$ and $R^{12}$ are 100% of the diol components in the copolyester;

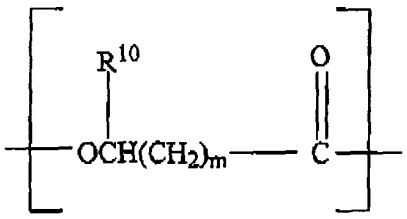
(iii) $R^{13}$ is absent or is selected from one or more of the groups consisting of $C_1$ - $C_{12}$ alkylene or oxyalkylene; $C_1$ - $C_{12}$ alkylene or oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$ - $C_{10}$ aryl, and $C_1$ - $C_4$ alkoxy; $C_5$ - $C_{10}$ cycloalkylene; and $C_5$ - $C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$ - $C_{10}$ aryl, and $C_1$ - $C_4$ alkoxy; and

(iv) $R^{14}$ is selected from one or more of the groups consisting of $C_6$ - $C_{10}$ aryl, and $C_6$ - $C_{10}$ aryl substituted with one to four substituents independently selected from the group consisting of halo, $C_1$ - $C_4$ alkyl, and $C_1$ - $C_4$ alkoxy;

2) an aliphatic polyester having repeat units of one or more of the following structures:



or



wherein m is an integer of from 0 to 10, and $R^{10}$ is selected from the group consisting of hydrogen; $C_1$-$C_{12}$ alkyl; $C_1$-$C_{12}$ alkyl substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; $C_5$-$C_{10}$ cycloalkyl; and $C_5$-$C_{10}$ cycloalkyl substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy,

wherein $R^8$ is selected from the group consisting of $C_2$-$C_{12}$ alkylene or $C_2$-$C_{12}$ oxyalkylene; $C_2$-$C_{12}$ alkylene or $C_2$-$C_{12}$ oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; $C_5$-$C_{10}$ cycloalkylene; $C_5$-$C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy, and

wherein $R^9$ is absent or is selected from one or more of the group consisting of $C_1$-$C_{12}$ alkylene or oxyalkylene; $C_1$-$C_{12}$ alkylene or

oxyalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; $C_5$-$C_{10}$ cycloalkylene; and $C_5$-$C_{10}$ cycloalkylene substituted with one to four substituents independently selected from the group consisting of halo, $C_6$-$C_{10}$ aryl, and $C_1$-$C_4$ alkoxy; and

3) $C_1$-$C_{10}$ cellulose ester having a DS equal to or less than about 2.5.

24. (Amended) The biodegradable polymer composition of claim [23] 22 wherein the biodegradable polymer or biodegradable polymer-second material composition comprises the aliphatic-aromatic copolyester and wherein $R^{11}$ and $R^{12}$ are the same or different, and are selected from the group consisting of residues of one or more of glycol, propylene glycol, 1,3-propanediol, 1,3-butanediol, and 1,4-butanediol, $R^{13}$ is selected from the group consisting of malonic acid, succinic acid, glutaric acid, adipic acid, pimelic acid, 2,2-dimethyl glutaric acid, diglycolic acid, and an ester forming derivative thereof, and $R^{14}$ is selected from the group consisting of one or more of 1,4-terephthalic acid, 1,3-terephthalic acid, 2,6-naphthoic acid, 1,5-naphthoic acid, and an ester forming derivative thereof.

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